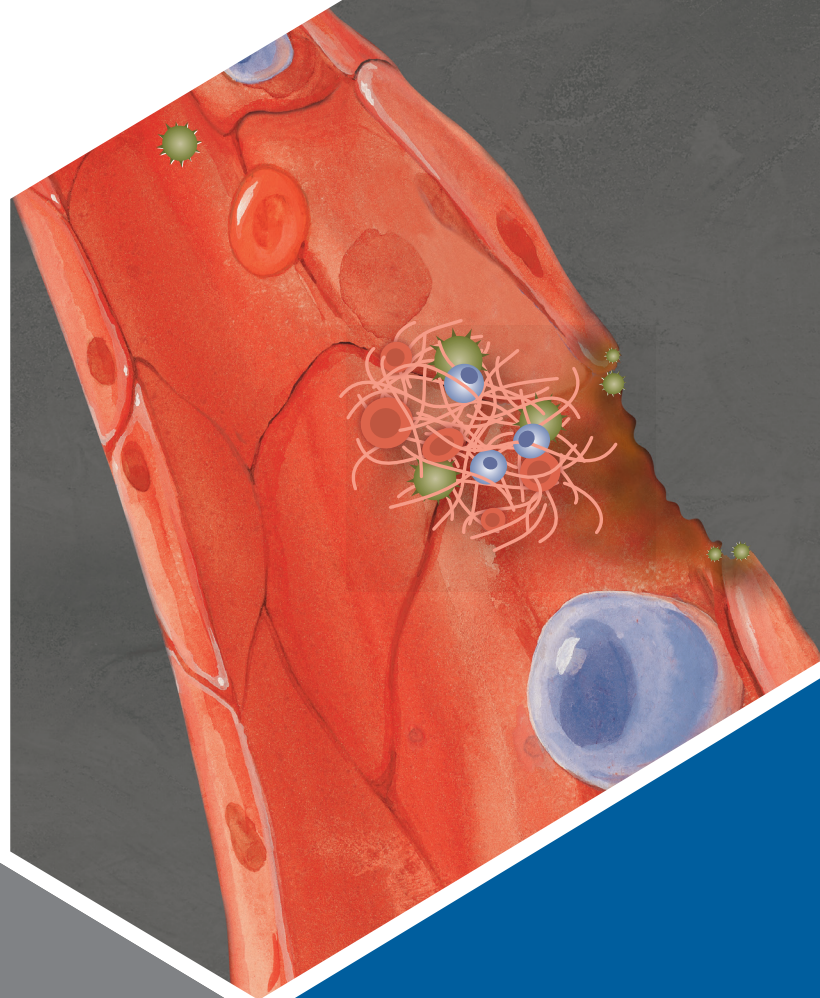
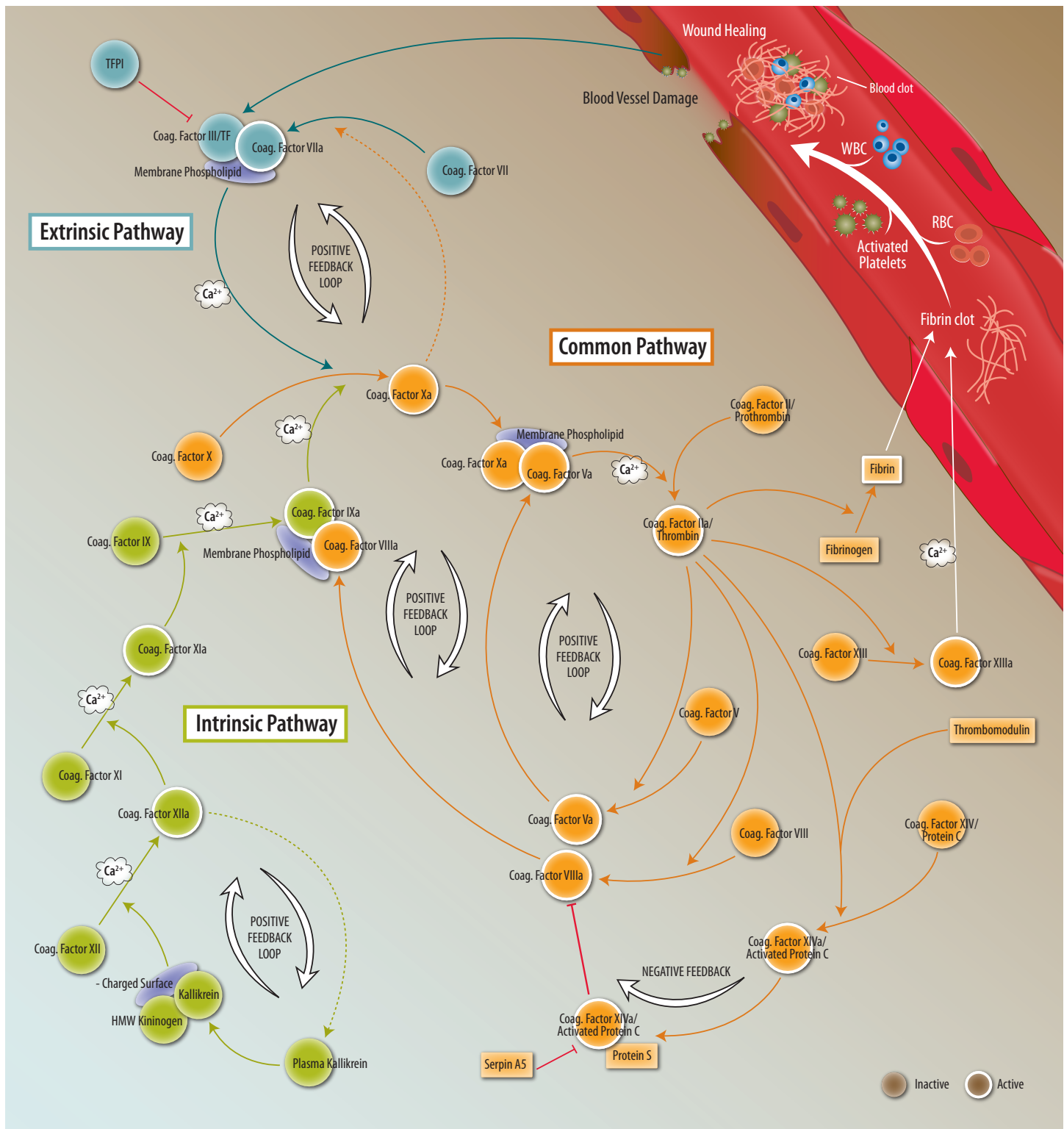


# Blood Coagulation





# Blood Coagulation

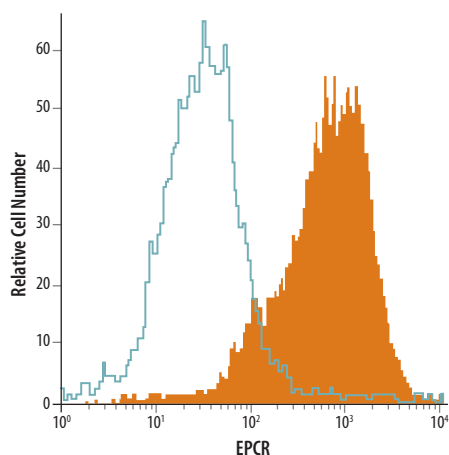
Injuries that damage blood vessels promote blood coagulation, a rapid response to initiate hemostasis and protect the host from excessive blood loss. Blood coagulation results from a series of proteolytic reactions involving the step-wise activation of coagulation factors. Subsets of these factors can be activated by two distinct pathways, the extrinsic, or tissue damage pathway (blue arrows), and the intrinsic, or contact pathway (green arrows). Each is initiated by different factors, but both converge upon a single common pathway (orange arrows) that leads to the activation of Coagulation Factor Xa, and the conversion of Prothrombin/Coagulation Factor II to active Thrombin/Coagulation Factor IIa. Thrombin converts Fibrinogen to Fibrin monomers which polymerize to form a Fibrin clot. The Fibrin clot acts in concert with activated platelets at the site of the injury to form a blood clot that stabilizes the damaged tissue and prevents further blood loss.

In addition to directly generating active Fibrin, Thrombin activates Coagulation Factor XIII, which stabilizes Fibrin and promotes its polymerization. Thrombin also activates Coagulation Factors V, VIII, and Protein C. These factors enhance or inhibit Thrombin production through positive or negative feedback. Factors Va and VIIIa promote Thrombin production by positively regulating either the cleavage of Prothrombin itself, or the cleavage and activation of Coagulation Factor Xa, respectively. In contrast, activation of Protein C by Thrombin binding to Thrombomodulin leads to the degradation of Factors Va and VIIIa, and inhibits the cleavage of Prothrombin. These forms of feedback regulation, along with the sequential activation of clotting factors, allow precise control of the blood coagulation cascade. This tight regulation is critical to prevent excessive blood loss associated with too little clotting, or too much clotting, which could result in the blockage of a blood vessel and lead to a heart attack or a stroke. Identifying other regulatory mechanisms may reveal additional molecular targets for exogenous control of clotting activity. R&D Systems offers a variety of research reagents useful for the characterization of molecules involved in blood coagulation pathways.

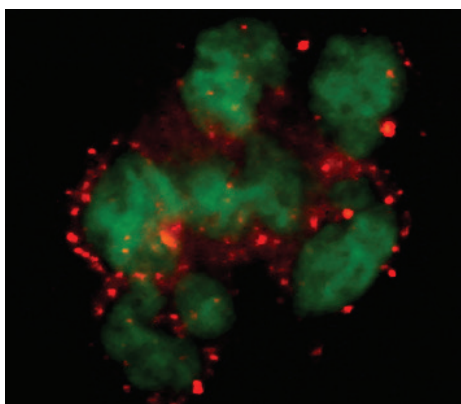
## Blood Coagulation Research Reagents Available from R&D Systems

| Molecule                                  | Recombinant & Natural Proteins | Antibodies | ELISAs/ Assays | Molecule                          | Recombinant & Natural Proteins | Antibodies | ELISAs/ Assays |
|---|--------------------------------|------------|----------------|-----------------------------------|--------------------------------|------------|----------------|
| ADAMTS13                                  | H                              | H          | H              | Kininogen                         | H M                            | H M        |                |
| Angiostatin                               | H                              | H          |                | $\alpha$ 2-Macroglobulin          | H                              | H M        | H              |
| Annexin A2                                |                                | H M R      | H              | PAR1                              | H                              | H          |                |
| Annexin A6                                | H                              | H          |                | PAR2                              |                                | H          |                |
| Annexin V                                 | H                              | H          | Ms             | Plasma Kallikrein/KLKB1           | H M                            | H M        |                |
| Apolipoprotein H/ApoH                     | H M                            | H M R      |                | Plasminogen                       | H                              | H          |                |
| Coagulation Factor II/Thrombin            | H                              | H          |                | Plasminogen Kringle 5             |                                | M          |                |
| Coagulation Factor III/Tissue Factor      | H M                            | H M        | H              | Protein S/PROS1                   |                                | H M        |                |
| Coagulation Factor VII                    | H M                            | H M        |                | SDNSF/MCFD2                       |                                | H M        |                |
| Coagulation Factor IX <i>coming soon!</i> | H                              |            |                | Serpin A1/ $\alpha$ 1-Antitrypsin | H M                            | H M        | H              |
| Coagulation Factor X                      | H M                            | H          |                | Serpin A5                         | H                              | H M        |                |
| Coagulation Factor XI                     | H M                            | H          |                | Serpin C1/Antithrombin-III        | H                              | H M        | H              |
| Coagulation Factor XIV/Protein C          | H M                            | H M        |                | Serpin D1/Heparin Cofactor II     | H M                            | H M        |                |
| Collagen I                                | B R                            |            | Ms             | Serpin E1/PAI-1                   | H                              | H M        | H              |
| Collagen II                               | H                              | M          | H              | TFPI                              | H M                            | H M        | H M            |
| Collagen IV                               | M                              | H          | Ms             | TFPI-2                            | H                              | H M        |                |
| Collagen XXV $\alpha$ 1                   |                                | H          |                | Thrombomodulin/BDCA-3             | H M                            | H M        | H M            |
| EPCR                                      | M                              | H M        | H              | u-Plasminogen Activator/Urokinase | H                              | H          | H              |
| Glycoprotein V/CD42d                      | H M                            | H M        |                | uPAR                              | H M                            | H M        | H M            |
| CD42b/GP1b $\alpha$                       | H M                            | H          |                | vWF-A2                            | H                              | H          | H              |
| GPVI                                      | H M                            | H M        |                |                                   |                                |            |                |

KEY: H: Human M: Mouse R: Rat B: Bovine Ms: Multi-species



**Detection of Endothelial Protein C Receptor (EPCR) in Mouse bEnd-3 Cells by Flow Cytometry.** Mouse bEnd-3 endothelial cells were stained with biotinylated anti-mouse EPCR polyclonal antibody (Catalog # BAF2749; filled histogram) or biotinylated normal goat IgG (Catalog # BAF108; open histogram) followed by APC-conjugated streptavidin (Catalog # F0050).



**Detection of Coagulation Factor VII in Human Peripheral Blood Mononuclear Cells (PBMC).** Coagulation Factor VII was detected in PHA-stimulated human PBMC using anti-human Coagulation Factor VII monoclonal antibody (Catalog # MAB2338). Cells were stained using a Rhodamine Red™ X-conjugated anti-mouse IgG secondary antibody (red) and counterstained with FluoroNissl™ Green (green).

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